

Vacuum System Mechanical Design Requirements

Property	Value	Comment
Vacuum level	10 ⁻⁸ torr in a 3-day period	specified by Beams Division
Leak rate	10 ⁻⁹ cc-atm/sec	
Maximum temperature	100 deg C	specified by Beams Division
Operating temperature	25 deg C	
Maximum Mat'l Radiation Length		
Pixel Vacuum Vessel Length	65.0" (165 cm)	reference BTeV Silicon Detector Integration Issues, Pixel 2002 Conference
Magnet ID		
Beam Aperture		
Microstrip ID		
Microstrip Total Radial Motion		
Forward Beam Pipe Material	aluminum 6061-T6	
Forward Beam Pipe Length	122.6" (311.4 cm)	based on estimated z-positions
Forward Beam Pipe Front z-position	29.0" (73.7 cm)	location where curved window ends (conceptual dwg 407007)
Forward Beam Pipe Back z-position	151.6" (385.0 cm)	location of front z-position of RICH detector (dwg 407007)
Forward Beam Pipe Inner diameter	1.0" (2.5 cm)	reference BTeV Vertex, Toroid Magnets, and Beampipe Requirements (doc 838)
Forward Beam Pipe Wall thickness	0.013"	reference BTeV Vertex, Toroid Magnets, and Beampipe Requirements (doc 838)
Forward Beam Pipe Line of Sight	0.75"	based on CDF Run II Be tube spec (2563.100-MD-339003)
Forward Beam Pipe Ass'y Straightness	0.063"	based on CDF Run II Be tube spec (2563.100-MD-339003)
Forward Beam Pipe Straightness	0.050"	based on CDF Run II Be tube spec (2563.100-MD-339003)
Forward Beam Pipe Roundness	0.020"	based on CDF Run II Be tube spec (2563.100-MD-339003)
Forward Beam Pipe Sag	0.018"	support @ z=120.5"; analysis one fixed end, one simply supported
Quantity - forward beam pipe	2	
Design safety factor	3 for collapse pressure	ASME BPVC Sec II, App 3
Window Outer Diameter	23.4" (59.5 cm)	from May, 2000 project proposal
Window Wall Thickness	0.023"	
Window Curvature	elliptical profile 2:1	
Window/Pipe Joint Radius	0.100"	
Weld type - beam pipe/window	TIG weld	
Quantity - window	2	
RICH beam pipe material	beryllium/aluminum	recycling CDF Run I beam pipe
RICH beam pipe Back z-position	288.0" (737.5 cm)	location of back z-position of RICH detector (dwg 407007)
RICH beam pipe Inner diameter	2.0" (5.1 cm)	Electrofusion drawing D-07595-100
RICH beam pipe Wall thickness	0.020" (0.051 cm)	Electrofusion drawing D-07595-100
RICH beam pipe Line of Sight	1.75"	Electrofusion drawing D-07595-100
RICH beam pipe Straightness	0.120"	Electrofusion drawing D-07595-100
RICH beam pipe Roundness	0.030"	Electrofusion drawing D-07595-100
RICH beam pipe Sag	0.003" (0.008 cm)	
Qty - RICH beam pipe	2	
Budget	\$174K	reference WBS 1.1.3.2.2 through 1.1.3.2.5
Time schedule	total design req. Fall '03	